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Research Article

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Effect of Spacing and Varieties on Quality Parameters of Rabi Onion (*Allium cepa* L.)

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ABSTRACT

A field experiment was conducted during 2018-19 at Horticulture Research Farm-2, Department of Horticulture, School of Agricultural Sciences and Technology, Babasaheb Bhimrao Ambedkar University, Lucknow (Uttar Pradesh), studies on the "Effect of spacing and varieties on quality parameters of rabi onion (Allium cepa L.). In trial different spacing (20×7.5 cm, 20×10 cm and 20×15cm) and three varieties Agri found Light Red, NHRDF-2 and NHRDF-3 was taken for study the layout of experimental field was laid down in Factorial Randomized Block Design with three replications. It is clearly revealed that the T.S.S. (^{0}Brix), ascorbic acid (mg), total sugars (%), reducing sugar (%), non-reducing sugar (%) and acidity (%) was found maximum in Agri found Light Red variety with the spacing of 20×10 cm.

Keywords: *Onion, Quality parameters, Spacing and Varieties*

INTRODUCTION

Onion (*Allium cepa* L.) is most important bulbous vegetable crop. It belongs to family Alliaceae order Asparagales composed of 795 species in genera. Its chromosome number is 2n=16. It is an important vegetable crop grown in India. India exports 12 per cent of total world export of onion. It is more than 75% of foreign exchange that comes from export of fresh vegetables. The onion plant has a fan of hollow, bluish-green leaves and its bulb at the base of the plant begins to swell, when a certain day-length is reached. The bulbs are composed of shortened, compressed, underground stems surrounded by fleshy modified scales (leaves) that envelope a central bud at the tip of the stem. It is originated from Central Asia. It is a biennial plant, but is usually grown as an annual and shallow rooted crop. It is basically long day plant for bulb production and grown during Rabi season. The leaves are yellowish to bluish green and grow alternately in a flattened, fan-shaped swathe. The important contents like allicin, allin and sulphites etc. are present in onion.

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These compounds are helps to fighting cancer, high blood cholesterol and sugar, liver problems and intestinal problems. It has diuretic and stimulant property. The antifungal property of onion is due to presence of catechol a phenolic compound. Onion is used for treating problems including loss of appetite, upset stomach, and gall bladder disorder, for treating heart and blood vessel problems including chest pain (angina) and high blood pressure and for "preventing hardening of the arteries" atherosclerosis. It is used in processed from i.e. flakes powder is used for making pickles (Bhagchandani et al., 1980). Onion is a cool season crop and it grows well in climate with extremes of high or low temperatures. For good vegetative growth lower temperatures, (daily mean 13-21^{o}C) and short photoperiod are required while for bulb development high temperatures (daily mean 15-25^{o}C) and long photoperiod are required. Rabi onion varieties require day length of 10-11 hours while, Rabi onion varieties require day length of 12-13 hours. Cole et al (1996) reported that highest commercial bulb yield was reported at higher planting density, while the highest proportion of large bulb and average bulb weight were examined at lower planting density.

MATERIALS AND METHODS

The present investigation entitled "Effect of spacing and varieties on quality parameters of rabi onion (*Allium cepa* L.)*''* was carried out in the Department of Horticulture, School of Agricultural Sciences and Technology during the year 2018-19. The analytical work was done in Department of Horticulture, School of Agricultural Sciences and Technology, Babasaheb Bhimrao Ambedkar University, Lucknow (Uttar Pradesh). The experiment was laid out in Randomized Block Design with factorial with three replications. Observations recorded to be quality parameters were recorded periodically like T.S.S. (^{0}Brix), ascorbic acid (mg), total sugars (%), reducing sugar (%), non-reducing sugar (%) and acidity (%). Statistical analysis of data obtained in different set of experiments was calculated following the standard procedure as stated by Panse and Sukhatme.

RESULTS AND DISCUSSION

Perusal of data on various quality parameters presented in Table -1 reveals that there was a significant variation in different genotypes. The factor which is directly related to quality attributes was recorded in the study like TSS, ascorbic acid, total sugars, reducing sugar, non-reducing sugar and acidity. Analysis of T.S.S. data clearly indicated that the T.S.S. content; ascorbic acid; total sugars; reducing sugar; non-reducing reducing sugar, acidity of onion bulb was varying from (12.90 to 10.08 ^{0}Brix, 0.81 to 0.40 mg/100g, 18.19 to 14.69%, 8.25 to 5.50%, 9.76 to7.76% and0.047 to 0.030%). Among the treatments, V_1S_3 (20x10 cm with Agri found Light Red), V_1S_3 (20x10 cm with NHRDF -2), V_1S_3 (20x10 cm with NHRDF -3) V_1S_3 (20x10 cm with NHRDF -3) V_1S_3 (20x15 cm with NHRDF -2) V_1S_3 (20x10 cm with NHRDF -3) recorded maximum T.S.S., ascorbic acid, total sugars, reducing sugar, non-reducing sugar and acidity.

Total soluble solids (TSS ^{0}Brix), ascorbic acid, total sugars, reducing sugar and non-reducing sugar has little difference in values no adverse effect of dense planting on bulb quality this results corroborated with the findings Pandey et al. (1980), Awasthi and Badiyala (1984) who reported that TSS and total sugars were significantly higher in wider spacing. Jelen et al. (1980) reported that the spacing had no specific effect on the accumulation of ascorbic acid in the fruit, but juice and organic acid content decreased and fruit pH increased with planting density. The results clearly announced that the conjoint use different spacing and varieties increased the onion bulb yield.

Table: 1 Effect of spacing and varieties on quality parameters of rabi onion (*Allium cepa* L.)

Treatment		T.S.S. (^{0}Brix)	Ascorbic acid (mg)	Total sugars (%)	Reducing sugar (%)	Non-reducing sugar (%)	Acidity (%)
		Effect of varieties					
Agri found Light Red	**V_1**	11.67	0.66	16.13	6.67	8.84	0.039
NHRDF-3	**V_2**	10.74	0.70	17.05	7.56	8.59	0.037
NHRDF-2	**V_3**	11.16	0.74	16.54	6.61	8.76	0.037
SE m±		**0.015**	**0.030**	**0.071**	**0.024**	**0.012**	**0.003**
CD (P=0.05)		**0.045**	**0.090**	**0.215**	**0.072**	**0.037**	**0.009**
		Effect of spacing					
20×7.5	**S_1**	10.80	0.63	16.27	6.32	8.43	0.031
20×10	**S_2**	11.40	0.74	16.87	7.32	8.43	0.041
20×15	**S_3**	11.36	0.73	16.59	7.20	9.34	0.040
SE m±		**0.015**	**0.030**	**0.071**	**0.024**	**0.012**	**0.003**
CD (P=0.05)		**0.045**	**0.090**	**0.215**	**0.072**	**0.037**	**0.009**
		Interaction effect (V×S)					
V_1S_1		10.06	0.40	14.69	5.50	8.35	0.030
V_1S_2		12.04	0.80	15.52	6.27	8.43	0.040
V_1S_3		12.90	0.81	18.19	8.25	9.76	0.047
V_2S_1		10.08	0.70	17.97	6.98	7.76	0.030
V_2S_2		11.07	0.70	17.08	7.51	8.78	0.040
V_2S_3		11.07	0.71	16.11	7.19	9.24	0.040
V_3S_1		12.27	0.80	16.17	6.47	9.19	0.033
V_3S_2		11.10	0.73	18.01	7.19	8.07	0.043
V_3S_3		10.11	0.68	15.46	6.17	9.02	0.033
SEm±		**0.026**	**0.052**	**0.123**	**0.041**	**0.021**	**0.005**
CD (P=0.05)		**0.079**	**0.156**	**0.372**	**0.124**	**0.065**	**0.014**

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